

REMARKS/ARGUMENT

Claims 1-69 and 71-74 are pending. Applicants appreciate the Examiner's determination that objected to Claims 3-9, 11-12, 16-18, 20, 33, 36-38, 41, 45-46 and 50-52 would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. Applicants respectfully submit, however, that the objected to claims are allowable in their current form since they depend from allowable claims.

1) Independent claims 1, 31, 39 and 60 are rejected under 35 U.S.C. § 103(a) as being unpatentable over applicants' admitted prior art (AAPA) in view of Dettman Introduction to Linear Algebra and Differential Equations 140-143, 166-169 (1974) and further in view of Mueller et al. (U.S. Pat. No. 5,323,322). Applicants respectfully traverse this rejection, as set forth below.

Independent Claims 1 and 31 require and positively recite, "circuitry for multiplying the signals times a conjugate transpose of an estimate of the channel effect **and times a conjugate transpose of a linear basis transformation matrix**". Independent Claim 39 requires and positively recites, "multiplying the signals times a conjugate transpose of an estimate of the channel effect **and times a conjugate transpose of a linear basis transformation matrix**". In his Office Action dated June 15, 2005, the Examiner determined, without citing support for the determination, that the admitted prior art taught "multiplying the conjugate transpose of the channel estimate with the conjugate of the linear basis transformation matrix or an eigenvector matrix (Office Action dated 06/15/2005, page 3, lines 17-19). Applicants respectfully disagree with the Examiner's above determination and request that the Examiner identify the page

and line support in the admitted prior art that supports his determination OR withdraw the rejection.

In addition to the above distinguishing limitation, Claims 1 and 31 further require and positively recite: “**circuitry for selecting the linear basis transformation matrix from a finite set of linear basis transformation matrices**” and “circuitry for removing the interference between the respective streams”; Claim 39 requires and positively recites, “**selecting the linear basis transformation matrix from a finite set of linear basis transformation matrices**” and “removing the interference between the respective streams”; Claim 60 requires and positively recites, “**selecting a matrix from a finite set of matrices** in response to one of the channel estimate and an interference cancellation technique” and “multiplying the plurality of signals by the channel estimate and the matrix”; and Claim 68 requires and positively recites, “**selecting a matrix from a finite set of matrices** in response to a signal from a remote transmitter” and “multiplying the plurality of signals by the matrix” (emphasis added). The Examiner admits the emphasized limitations are not disclosed by AAPA or Dettman (Office Action dated 06/15/2005 page 3, lines 20-22) but relies upon Mueller et al. for these limitations (Office Action dated 06/15/2005, page 3, line 22 – page 4, line 5).

Similarly, the Examiner admits (Office Action dated 06/15/2005, page 4, lines 1-2) that Mueller et al does not disclose selecting from a “finite set” of matrices. The Examiner attempts to negate this omission in Mueller by stating “the Householder matrix selected is a combined set of vector and matrix, which would indicate that the selection is selected from a finite set” (Office Action dated 06/15/2005, page 4, lines 3-5). Applicants respectfully challenge this determination. Mueller teaches circuitry for selecting a transform matrix, BUT it generates each of them on the fly and does NOT select them from a “finite set” of linear basis transformation matrices and it does not have circuitry for removing the interference from the respective end streams. Assuming,

arguendo, that the Householder matrix uses a series of rotation operations, the selection is made from a potential INFINITE number of sets which are “generated on the fly” and NOT “selected from”. As such, any combination of the admitted prior art and Mueller fails to teach or suggest, “**... selecting the linear basis transformation matrix from a finite set of linear basis transformation matrices**” and “circuitry for removing the interference between the respective streams”, as required by Claims 1, 31 and 39, OR “**selecting a matrix from a finite set of matrices** in response to one of the channel estimate and an interference cancellation technique”, as required by Claim 60, or “**selecting a matrix from a finite set of matrices** in response to a signal from a remote transmitter”, as required by Claim 68 .

Claim 60, in addition to the above, requires and positively recites, “multiplying the plurality of signals **by the channel estimate and the matrix**”. Claim 68, in addition to the above, requires and positively recites, “multiplying the plurality of signals **by the matrix**”. Nowhere does the Examiner address this additional limitation and point out where it is in the cited reference(s). As such, the Examiner has not considered all the words of Claims 60 and 68, as required by law.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest ALL the claim limitations. (MPEP § 2143). Applicants respectfully submit that the Examiner has failed to establish all three criteria. Thus, Claims 1, 31, 39, 60 and 68 are patentable under 35 U.S.C. § 103(a) over AAPA in view of Dettman and further in view of Mueller et al.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. “The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.” *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Examiner fails to offer any rationale for combining AAPA with Mueller et al. A statement that modifications of the prior art to meet the claimed invention would have been “well within the ordinary skill of the art at the time the claimed invention was made” because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.).

Moreover, the disclosure of Mueller et al. is directed to a completely different purpose than AAPA. Mueller et al. specifically discloses “The transformation is used to eliminate the unwanted reference receiver clock errors in Y_k leading to a corrected measurement vector y_k .” (col. 18, lines 39-41). These reference clock errors of Mueller et al. are unrelated to signal interference of the present invention. Mueller discloses a networked differential GPS system in which there are a worldwide network of differential stations that continually track the entire GPS constellation, with each satellite having a single transmitter and single antenna. The Examiner fails to provide any evidence that Mueller discloses how a circuit to correct reference clock errors might be used to “remove signal interference”. While Mueller discloses “drifts in the clock of each GPS satellite will impact user position solution accuracy” (col. 1, lines 36-38) – there is no teaching whatsoever in Mueller or the admitted prior art that “drifts in GPS satellite clocks are the same as, or cause, “signal interference”. “Drift” and “interference” are not the same concepts. Accordingly, the Examiner’s determination is supposition not supported fact, is little more than improper hindsight reconstruction, and must be withdrawn. Similarly, there can be no reasonable expectation that such a combination, even if possible, would be successful.

Finally, Examiner states “Mueller et al. discloses choosing a linear transformation matrix, specifically a Housholder transformation matrix, and using the transformation to remove the **interference or** reference receiver clock errors” (Office Action dated 06/15/05, page 3, line 22 – page 4, line 1). The Examiner also states “Mueller et al teaches unsynchronized signal transmission causes satellite clock errors, **which cause interference or** errors in the received data affects the receiver’s accurate analysis of the position or location of the satellite” (Office Action dated 11/16/05, page 3, lines 8-11). Applicants challenge the Examiner’s equating “interference” with “clock errors” without any evidence from Mueller or other prior art. For the record, Mueller et al. is silent on interference. The word “interference” is not found in the disclosure of Mueller et al. Furthermore, Mueller et al. does not disclose “circuitry for selecting the linear basis transformation matrix” or

“circuitry for removing interference” as required by claims 1 and 31 AND “selecting the linear basis transformation matrix” or “circuitry for removing interference” as required by Claim 39. As a result, it would NOT have been obvious to one skilled in the art to remove “interference” by selecting a linear transformation and using it to remove unwanted reference receiver clock errors, as suggested by the Examiner (Office Action dated 11/16/2005, page 3, lines 11-14). Similarly, the Examiner fails to address the additional limitation of Claim 60, “multiplying the plurality of signals by **the channel estimate and the matrix**” and the additional limitation of Claim 68, “multiplying the plurality of signals by **the matrix**”. For all the foregoing reasons, therefore, Claims 1, 31, 39, 60 and 68 are patentable under 35 U.S.C. § 103(a) over any combination of the admitted prior art and the Mueller reference.

Claims 2, 10, 13-15, 19, 21-30 depend directly, or indirectly, from Claim 1 and stand allowable for the reasons provided above in support of the allowance of Claim 1. Claims 32, 34, and 39 depend directly from Claim 31 and stand allowable for the reasons provided above in support of the allowance of Claim 31. Claim 40 stands allowable for the reasons provided above in support of the allowance of Claim 39. Claims 61-67 stand allowable for the reasons provided above in support of the allowance of Claim 60. Claims 69-74 stand allowable for the reasons provided above in support of the allowance of Claim 68.

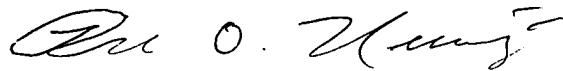
2) Independent Claim 42 is rejected under 35 U.S.C. § 103(a) as being unpatentable over applicants’ admitted prior art (AAPA) in view of Dettman Introduction to Linear Algebra and Differential Equations 140-143, 166-169 (1974), further in view of Mueller et al. (U.S. Pat. No. 5,323,322) and further in view of Jöngren et al. (US Publication No.: 20010033622). Applicants respectfully traverse this rejection, as set forth below.

Independent Claim 42 requires and positively recites, “a plurality of transmit antennas for transmitting the signals, the signals comprising respective streams of independent symbols and **wherein interference occurs between the respective streams**”, “circuitry for multiplying **symbols times a linear basis transformation matrix**, wherein the signals are responsive to the multiplication times a linear basis transformation matrix” and “**circuitry for selecting the linear basis transformation matrix in response to a communication received by the transmitter from the receiver via a feedback channel**”. As previously discussed, a combination of AAPA with Mueller et al. is improper. Moreover, Mueller et al. is silent on interference and does not disclose “INTERFERENCE occurring between the respective streams” or “circuitry for selecting the linear basis transformation matrix in response to a communication received by the transmitter from the receiver via a feedback channel”. Thus, Claim 42 is also patentable under 35 U.S.C. § 103(a) over any combination of the prior art and Mueller.

Claims 43-44, 47-49 and 53-59 stand allowable for the reasons provided above in support of the allowance of Claim 42.

In view of the foregoing, applicants respectfully request reconsideration and allowance of claims 1-69 and 71-74. If the Examiner finds any issue that is unresolved, please call applicants' attorney by dialing the telephone number printed below.

Respectfully submitted,



Ronald O. Neerings
Reg. No. 34,227
Attorney for Applicants

TEXAS INSTRUMENTS INCORPORATED
P.O. BOX 655474, M/S 3999
Dallas, Texas 75265
Phone: 972/917-5299
Fax: 972/917-4418